

Abstract of the Disclosure

A  $2 \times 2$  optical switching apparatus using photonic crystal structures has a compact, simple structure and includes an optical-guide module having first, second, third and fourth waveguides, the first and second waveguides guiding a first optical signal of a first input port to a first and a second output port, respectively, the third and fourth waveguides guiding a second optical signal of a second input port to the second and the first output ports, respectively, and formed with photonic crystals having a complete photonic bandgap for a wavelength range of the first and second optical signals, and a switching control section controlling the first and second optical signals to be respectively guided through either a first/third waveguide route or a second/fourth waveguide route according to a route-selecting-control signal inputted from outside. The  $2 \times 2$  optical switching apparatus has no mechanical motion, little polarization dependence and may be efficiently used in optical networks.